

REMARKS/ARGUMENTS

Claims 27, 29-52, 63, 65-88 and 92-95 are pending in the application. Claims 27, 38, 42, 63, 74, and 78 are amended. Claims 28 and 64 are cancelled. No Claims are added. The amendments to the claims as indicated herein do not add any new matter to this application.

AMENDMENTS TO THE CLAIMS

This section has been included in order to inform which of the new claims (that have been added since the original patent) have been amended since the last response to Office Action. The limitation of Claim 28 was amended into Claim 27 and Claim 28 has been canceled. Claim 63 is the computer-readable medium claim corresponding to Claim 27 and has similar amendments as Claim 27. Claim 64 is canceled.

Claim 38 has been amended to clarify that the query processing is performed in the context of a database system. Also, the term “user-specified degree of parallelism” has been clarified with the amendment “wherein the user-specified degree of parallelism expressly indicates a specific number of entities to use in parallel to perform the database operation.” The preamble to Claim 38 has also been amended to “processing a query statement” in order to conform with the terms as used in the other limitations of Claim 38. Claim 74 is the computer-readable medium claim corresponding to Claim 38 and has similar amendments as Claim 38.

Claims 39-41 have been amended to change any instances of the term “query” to “statement” in order to conform these dependent claims with independent Claim 38. In addition, Claim 40 has been amended to depend upon Claim 38 rather than Claim 39. Claims 75-77 are the computer-readable medium claims corresponding to Claims 39-41 and has similar amendments as Claims 39-41.

Claim 42 has been amended to clarify that the query processing is performed in the context of a database system. In addition, the term “work partition” has been clarified with the amendment “each work partition of said set of work partitions to be performed serially by a single entity to which said work partition is assigned.” In addition, the term “hints” has been clarified with the amendment “wherein said query fragments incorporating hints comprise work partitions that may be performed in a plurality of ways to reach a same result, and wherein the said hint associated with a given query fragment indicates how to perform the work partition associated with said given query fragment one way of the plurality of ways to perform the work”

partition” (amendment shown with amendment markings of non-reissue responses) and “entities working on a query fragment associated with a hint perform the work partition associated with said query fragment in ~~a manner~~ said one way dictated by said hint.” (amendment shown with amendment markings of non-reissue responses). Claim 78 is the computer-readable medium claim corresponding to Claim 42 and has similar amendments as Claim 42.

ACKNOWLEDGEMENT OF IDS

After a review, it has been found that seven IDSs submitted on the following dates: 1) June 2, 2006, 2) July 20, 2006, 3) August 25, 2006, 4) November 3, 2006, 5) January 16, 2007, 6) February 20, 2007, and 7) July 30, 2007, have not been considered by the Examiner. Applicants hereby request that the IDSs listed above are acknowledged and considered by the Examiner and an initialed copy returned with the next Office Communication.

INTERVIEW SUMMARY

On Friday, August 7, 2009, Applicants, represented by Robert Chee and Brian Hickman, conducted an interview with the USPTO, represented by Examiner Dennis Truong. Claims 27, 38, and 42 of the Application were discussed in relation to the references, *Hongjun*, *Osano*, and *Matsumoto*. Applicants agreed to submit a formal reply for further consideration by the Examiner.

CLAIM REJECTIONS--35 U.S.C. § 102

Claims 27-28 and 63-64 were rejected under 35 U.S.C. § 102(b) as being allegedly anticipated by Hongjun Lu and Kian-Lee Tan (“Dynamic and Load-balance Task-Oriented Database Query Processing in Parallel Systems”) (“*Hongjun*”). This rejection is respectfully traversed.

Claims 38 and 74 were rejected under 35 U.S.C. § 102(e) as being allegedly anticipated by U.S. Patent No. 5,442,569 A (“*Osano*”). This rejection is respectfully traversed.

CLAIMS 27 AND 63

Among other things, Claim 27 recites “wherein the step of assigning work partitions is performed by *assigning the work partitions in a sequence based at least in part on sizes*

associated with the work partitions with relatively larger work partitions assigned before relatively smaller work partitions.” The Office Action states that *Hongjun* anticipates this limitation in Sec. 3.1. The Office Action states “*Hongjun* discloses the process of generating tasks and discloses that the number of buckets determines the number of tasks which is represented by B, and the task table is generated from initial set of tables which represents the tasks and corresponding size of buckets. It is further disclosed that size of buckets are generated with large size of buckets first then the small buckets merged into larger ones. Since the task table is generated from the initial set of tables and the larger buckets are first generated this shows that the resulting task table will represent a queue of task where the larger size of buckets are first. Therefore in section 2.2 and 3.2 where the processors are acquiring task[s] the processors will be selecting the task with the larger size of buckets which meets the limitation as claimed.” (*Office Action*, pp. 5-6).

In Claim 27, the work partitions are assigned in “*a sequence based at least in part on sizes*”. In *Hongjun*, size is considered during the task generation phase but in a way much different than the sequence of work partitions recited in Claim 27. In *Hongjun*, the number of partitions may have an impact on the performance of the algorithm. One would does not want too many buckets (too much overhead), or too few buckets (leading to the size of a bucket exceeding the main memory size). As a compromise, a large number of small buckets are created and these small buckets may be merged into larger ones that are still able to be staged within memory. (*Hongjun*, Sec 3.1). Thus, the size of the partitions are taken into account by *Hongjun*, but *Hongjun* does not state that the partitions are placed in any sort of sequence based on size. The only size taken into account by *Hongjun* is that the partition would be such that the partition may be performed within the main memory size. When the task table in *Hongjun* is built (denoting the order to perform tasks), the sizes of the partitions created are also not considered. (*Hongjun*, Sec 3.1).

In Claim 27, assigning work partitions is based on a sequence of work partitions. In order to better clarify how the assignments are made with the sequence of work partitions, the amendment “*with relatively larger work partitions assigned before relatively smaller work partitions,*” originally appearing in Claim 28, has been added. This clarifies that when the work partitions are assigned in a sequence, larger work partitions are assigned earlier than smaller work partitions. Thus, not only does *Hongjun* fail to anticipate the Claim 27 limitation of work

partitions assigned in “*a sequence based at least in part on sizes,*” but also the limitation that the sequence is ordered “*with relatively larger work partitions assigned before relatively smaller work partitions.*” As not every limitation of Claim 27 been anticipated by *Hongjun*, Claim 27 should be allowed and Applicants respectively request reconsideration of the rejection of Claim 27.

Claim 63 is the computer-readable medium claim of Claim 27 and is similarly allowable. Claims 28 and 64 have been canceled making the rejections of Claims 28 and 64 moot.

CLAIMS 38 AND 74

Claim 38 recites “determining, at the database server, a user-specified degree of parallelism to use in performing the database operation, *wherein the user-specified degree of parallelism expressly indicates a specific number of entities to use in parallel to perform the database operation.*” The Office Action states that *Osano* anticipates this limitation in Col. 16, lines 55-56, and col. 18, lines 19-22.

However, *Osano* describes a method for analyzing and solving sets of linear equations. First, Claim 38 has been amended to claim that processing of a query is within a database context (“processing a query in a database system”, etc.). *Osano* fails to anticipate that any of the processes for the decomposition of linear equations may also be used within the context of database systems. Notwithstanding that argument, *Osano* also fails to anticipate a “a user-specified degree of parallelism to use in performing the database operation.” In *Osano*, user requirements are used to specify the number of linear equations to be placed in each subsystem. (*Osano*, col. 16, lines 55-58). However, no connection is made between specifying the number of linear equations within each subsystem and the number of processors that would be used to solve that set of linear equations.

Osano does describe hardware implementations to be used with the subsystem of linear equations, but states that “approaches of FIGs 13a-13c can be combined to achieve the best operating performance for a given set of user requirements” (Col. 18, lines 20-22). Another section states “the number of parallel processing stages is determined by the operating performance and specifications determined by the user” (col. 19, lines 4-6). Both of these offer approaches of parallel processing, but the first statement is only concerned with achieving the best performance and second statement refers to parallel processing *stages*, not parallel

processing itself. No statement relating user requirements to the amount of parallel processing to be used to solve an equation is able to be found.

In addition, Claim 38 has been amended to clarify that “*the user-specified degree of parallelism expressly indicates a specific number of entities to use in parallel to perform the database operation.*” User requirements in *Osano* appear only to be concerned with “the number of linear equations, processing time constraints, and other hardware constraints” (Col. 16, lines 56-58), and do not state “*a specific number of entities to use in parallel to perform the database operation*” as required by Claim 38. As such, not every limitation of Claim 38 has been anticipated by *Osano*, and Claim 38 should be allowed. Claim 74 is the computer-readable medium claim of Claim 38 and is similarly allowable.

CLAIM REJECTIONS—35 U.S.C. § 103

Claims 42 and 78 were rejected under 35 U.S.C. § 103(a) as being allegedly unpatentable over Hongjun Lu and Kian-Lee Tan (“Dynamic and Load-balance Task-Oriented Database Query Processing in Parallel Systems”) (“*Hongjun*”) in view of U.S. Patent No. 5,448,732 A (“*Matsumoto*”). This rejection is respectfully traversed.

Among other things, Claim 42 requires “dividing, at a database server, a database operation required by said query into a set of work partitions by generating a set of query fragments.” The Office Action states that *Hongjun* teaches or suggests this limitation in Sec 2.1 as “where a query is decomposed into an optimal amount of tasks, where the query is the operation and the tasks are work partitions.” (Office Action, p. 8). As in *Hongjun*, Claim 42 does recite dividing an operation into work partitions in preparation for parallel processing. However, Claim 42 also recites “generating a set of query fragments.” Nothing similar to query fragments is taught or suggested in *Hongjun* and the Office Action fails to offer any other reference for “query fragments.” As such at least one limitation of Claim 42 is not taught or suggested by the cited references.

Claim 42 also recites “each work partition of said set of work partitions to be performed serially by a single entity to which said work partition is assigned; incorporating hints into at least some of said query fragments at said database server, wherein said query fragments incorporating hints comprise work partitions that may be performed in a plurality of ways to reach a same result, and wherein said hint associated with a given query fragment indicates one

way of said plurality of ways to perform said work partition.” The Office Action states that *Matsumoto* teaches or suggests this limitation in Col. 11, line 56 - col. 12, line 20 where the flags are hints that are sent along with the designated group where the group are fragments or tasks to be assigned to the processor. (Office Action, p. 9).

First, Claim 42 has been clarified to recite “each work partition of said set of work partitions to be performed serially by a single entity to which said work partition is assigned.” This is to distinguish that the work partitions recited in Claim 42 may not be further divided into further work partitions for parallel processing. As such, any user-specified degree of parallelism would not apply to these work partitions.

Second, hints has been clarified to read “hints into at least some of said query fragments at said database server, wherein said query fragments incorporating hints comprise work partitions that may be performed in a plurality of ways to reach a same result, and wherein said hint associated with a given query fragment indicates one way of said plurality of ways to perform said work partition.” The Office Action states that “the flags are hints that are sent along with the designated group where the group are fragments or tasks to be assigned to the processor.” However, the group as discussed in *Matsumoto* is actually a group of processors. *Matsumoto* describes ways of increasing the efficiency of synchronizing multiprocessor systems. One way to do that is to assign flags that may indicate an interrupt state or the number of processors in the queue to groups of processors rather than one processor at a time. Thus, the flags described in *Matsumoto* are not analogous to the hints incorporated into query fragments as recited in Claim 42, and the groups of processors are not the same as tasks to be assigned to the processor as recited in Claim 42. The Office Action admits that this limitation is not taught or suggested in *Hongjun*. As such, not every limitation of Claim 42 has been taught or suggested by *Hongjun* or *Matsumoto*, alone or in combination, and Claim 42 should be allowed. Claim 78 is the computer-readable medium claim of Claim 42 and is similarly allowable.

CONCLUSION

For the reasons set forth above, it is respectfully submitted that all of the pending claims are now in condition for allowance. Therefore, the issuance of a formal Notice of Allowance is believed next in order, and that action is most earnestly solicited.

The Examiner is respectfully requested to contact the undersigned by telephone if it is believed that such contact would further the examination of the present application.

Please charge any shortages or credit any overages to Deposit Account No. 50-1302.

Respectfully submitted,
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